

U. S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL WEATHER SERVICE
NATIONAL METEOROLOGICAL CENTER

OFFICE NOTE 285

(REVISED)

The Guess for the O/I

T126, 18 Layer

John D. Stackpole
Automation Division

January 1991

This is a description of the guess files needed for the AVN and FNL global O/I analyses, where they come from, and their backup contingencies. Additional sections indicate the sources of the guesses for the SCM analysis (used in the ERL run for the LFM forecast), and the Hough analysis (used as the backup analysis in the AVN run if the CYBER and CRAY are both down or otherwise unavailable).

In the short term, the RAFS analysis will use the Triangular 80-wave (T80) guess as described in the previous version of this Office Note, dated July 1990. Also the CYBER version of the spectral model, run as backup, uses the T80 guess. Eventually the RAFS will switch to the guess described here and the CYBER will no longer be available.

I. WHAT GUESS INFORMATION DOES THE I/O ANALYSIS NEED?

In general, the O/I analysis needs three classes of meteorological quantities as guesses:

A. A forecast of sigma layer spectral coefficients, presumably valid at the time of the analysis. The number of layers and wave structure of the coefficients must, of course, match the analysis model.

B. Mandatory pressure level analysis error standard deviation spectral coefficients from the previous global O/I analysis - the same analysis that supplied the initial conditions for the sigma coefficients forecast in A.

C. A forecast of a collection of boundary layer parameters (some unchanging) valid at the time of the analysis.

At the present time the regional and global O/I analyses require 18 sigma layers and an 126-wave triangular truncation spectral resolution in the guess sigma coefficients. The error coefficients must be supplied in the 12 mandatory levels at a 30-wave rhomboidal resolution. The boundary layer parameters are carried as grid point values on the 72960 point (384x190) T126 global gaussian transform grid. The guess quantities reside in files on the HDS9000 computer system and are copied to the CRAY as needed.

The files for the guesses are:

Sigma forecasts: NMC.PROD.CRSGES.TttZ.FNL

Analysis errors: NMC.PROD.CREGES.TttZ.FNL

Boundary parameters: NMC.PROD.CRBGES.TttZ.FNL

where tt = 00 or 12 according to the cycle.

As with all guess files, the naming convention for the cycle time (00Z or 12Z) indicates the time at which the guess is to be used, not the cycle in which the guess quantities were generated. Because of backup possibilities, there is no guarantee that the guess information in the files is from the first choice or normal source. The run that generated the guess, the initial time of the forecasts, and the specific date of the analysis that supplied the analysis errors are included in the files for the O/I system to do with as it pleases. Also, in operations, the code that selects the guess from the various possibilities (GGEST126, running in JOB 110), writes a message to the Senior Duty Meteorologist's console and the run log stating which possibility was indeed selected.

In full detail the content of the files looks like this (using "Structured Data Dictionary" notation):

CRSGES =

```

ON85LABEL
+
SELALABEL
+
Z*
+
ln(p*)
+
{T}18
+
{S+D}18
+
{R}18
+
QPF

```

for a total of 77 records.

CREGES =

```

ON85LABEL
+
TAUIDATE
+
{ZE}12
+
{UE+VE}12
+
{RHE}6

```

for a total of 44 records.

CRBGES =

ON85LABEL
+
TAUIDATE
+
TSCF
+
SOILM
+
SNOW
+
TG1
+
TG2
+
TG3
+
ZOR
+
CV
+
CVB
+
CVT
+
ALB
+
SLMASK

for a total of 14 records.

On the HDS9000, all the numbers (real and integer) are 32 bits in length. On the CRAY all numbers are carried as 64 bit words.

Defining the elements:

ON85LABEL = Just what it sounds like, the NMC Office Note 85 file label;

SELALABEL = One record, totalling 212 words
(all real numbers excepting IDATE):
TAU + IDATE + SIGMA8 + DUMMY + WAVES + XLAYERS +
TRUN + ORDER + REALFORM + GENCODE;

TAUIDATE = One record: TAU + IDATE

TAU = the forecast hour;

IDATE = hour + month + day + year-of-century,
specifying the hour (UTC) and date/time of the
analysis, or the initial date/time of the
forecast;

SIGMA8 = Values of the sigma coordinate at 19 levels from the ground up, followed by the sigma coordinate difference across the 18 layers;

DUMMY = An array of zeros, dimensioned such that SIGMA8 + DUMMY totals 201 words (this allows for future growth of the model);

WAVES = Horizontal resolution (longitudinal wave number) of the forecast model;

XLAYERS = Vertical resolution (number of layers) of the forecast model;

TRUN = Mode of spectral coefficient truncation:
 1.0 - Triangular
 2.0 - Rhomboidal;

ORDER = Layout of the coefficients in arrays:
 1.0 - By Row (or hypotenuse),
 CRAY style
 2.0 - By column, HDS style;

REALFORM = Format of real numbers:
 1.0 - IBM format
 2.0 - CYBER format
 3.0 - CRAY format;

GENCODE = NMC Office Note 84 Generating code (Table 10) for the forecast model;

$Z^*, \ln(p^*), T, S, D, R$ = Spectral coefficients (8128 complex numbers, T126 truncation) representing terrain height, log of surface pressure, virtual temperature, vorticity, divergence, and specific humidity;

ZE, UE, VE, RHE = Spectral coefficients (31x31 complex numbers, R30 truncation) representing analysis error standard deviation of height, u wind component, v wind component, and relative humidity;

QPF = Array of (384x190) words of quantitative precipitation forecast on the T126 gaussian transform grid, meters;

TSCF = Array of (384x190) words of sea surface and land surface temperatures, deg. K;

SOILM = Array of (384x190) words of Ground wetness, mm;

SNOW = Array of (384x190) words of Snow depth, m;

TG1, TG2, TG3 = Arrays of (384x190) words of underground temperature at three levels, deg. K;

ZOR = Array of (384x190) words of ground roughness parameter, cm;

CV = Array of (384x190) words of convective cloud amount - percentage;

CVB = Array of (384x190) words of sigma level (1-18) of convective cloud base;

CVT = Array of (384x190) words of sigma level (1-18) of convective cloud tops;

ALB = Array of (384x190) words of surface albedo, fraction;

SLMASK = Array of (384x190) words of land/sea/seaice mask: 0=sea, 1=land, 2=ice.

The file name in ON85LABEL is made up from the third qualifier in the corresponding data set name, CRSGES, CREGES and CRBGES respectively, and the cycle time for which the guess is valid, i.e., 00Z or 12Z. The names are SGES00, SGES12, EGES00, EGES12, BGES00, and BGES12. (Preliminary guess files for the off-time analysis in the GDAS, for use at 06Z and 18Z, are also prepared and identified accordingly. Their construction essentially parallels the on-time guess construction.) The run marker in the ON85 label is set to indicate the source of the guess. Normally this is the FNL run (R=5), but if a backup source is used (see below) the run marker may indicate the AVN run (R=3).

II WHENCE THE GUESS AND WHAT'S THE BACKUP?

As mentioned above, a program called GGEST126 runs early in the 00Z and 12Z cycles (as a step in Job 110) with the task to select appropriate material and write it into the CREGES, CRSGES and CRBGES files. The selection process is one of checking that the most desirable quantities are available or, failing that, searching through a hierarchy of backup possibilities. The idea is to assure that, barring total disasters, some reasonably usable guess is always available for the analysis models.

FIRST CHOICE: GDAS FROM THE PREVIOUS FNL RUN

The first choice, of course, is the six-hour forecast generated in the second half of the GDAS from the previous FNL run. For the 00Z guess, the input files are:

Sigma Forecast: NMC.PROD.CRSF06.T18Z.FNL
Analysis errors: NMC.PROD.CREANL.T18Z.FNL
Boundary parameters: NMC.PROD.CRBF06.T18Z.FNL

and for the 12Z guess:

Sigma Forecast: NMC.PROD.CRSF06.T06Z.FNL
Analysis errors: NMC.PROD.CREANL.T06Z.FNL
Boundary parameters: NMC.PROD.CRBF06.T06Z.FNL

The test for the availability of the guess from this source is simple: the date/time on the CRSF06 file must be such that the 6-hour forecast is valid at the current date/time and all the files must be complete. If any of these conditions are not met, for whatever reason, the FNL is rejected as a source for the guess and we start searching through the backup choices.

SECOND CHOICE: 12-HOUR FORECAST FROM THE EARLIER AVN RUN

The second choice (the first backup option) is to turn to the 12-hour forecast from the previous cycle's AVN run. The input files are, for the 00Z guess:

Sigma Forecast: NMC.PROD.CRSF12.T12Z.AVN
Analysis errors: NMC.PROD.CREANL.T12Z.AVN
Boundary parameters: NMC.PROD.CRBF12.T12Z.AVN

and for the 12Z guess:

Sigma Forecast: NMC.PROD.CRSF12.T00Z.AVN
Analysis errors: NMC.PROD.CREANL.T00Z.AVN
Boundary parameters: NMC.PROD.CRBF12.T00Z.AVN

As before, the test for the availability of the guess from this source is simple: the date/time on the CRSF12 file must be such that the 12-hour forecast is valid at the current date/time and all the files must be complete. If any of these conditions are not met, for

whatever reason, the 12 hour old AVN is rejected as a source for the guess and we turn to the next of the backup choices.

THIRD CHOICE: 24-HOUR FORECAST FROM THE PRIOR AVN RUN

The third choice (the second backup option) is to turn to the 24-hour forecast from the AVN run two cycles back. The input files are, for the 00Z guess:

Sigma Forecast: NMC.PROD.CRSF24.T00Z.AVN

Analysis errors: NMC.PROD.CREANL.T00Z.AVN

Boundary parameters: NMC.PROD.CRBF24.T00Z.AVN

and for the 12Z guess:

Sigma Forecast: NMC.PROD.CRSF24.T12Z.AVN

Analysis errors: NMC.PROD.CREANL.T12Z.AVN

Boundary parameters: NMC.PROD.CRBF24.T12Z.AVN

As ever, the test for the availability of the guess from this source is simple: the date/time on the CRSF24 file must be such that the 24-hour forecast is valid at the current date/time and all the files must be complete. If any of these conditions are not met, for whatever reason, the 24-hour old AVN is rejected as a source for the guess and we turn to the next of the backup choices. There are not many choices left.

FOURTH CHOICE: CARRY FORWARD THE 12-HOUR OLD GUESS

In the rather unlikely event that none of the above was available, our next recourse is to pick up the guess that was used 12 hours ago, in the previous cycle, and simply copy it forward. The input files are, for the 00Z guess:

Sigma Forecast: NMC.PROD.CRSGES.T12Z.FNL

Analysis errors: NMC.PROD.CREGES.T12Z.FNL

and for the 12Z guess:

Sigma Forecast: NMC.PROD.CRSGES.T00Z.FNL

Analysis errors: NMC.PROD.CREGES.T00Z.FNL

The availability test for this choice is that the CRSGES file must contain a 6-hour forecast valid 12 hours ago; i.e., the FNL must

have run properly two cycles back and the GGEST126 code must have worked properly in the previous cycle.

Note that the boundary parameters (CRBGES) are NOT carried forward; the CRBGES file is left as is. This is because of the strong diurnal variation in some of the boundary parameters - a 24-hour old CRBGES is much more appropriate to use than a 12-hour old guess that is out of phase with the diurnal cycle.

FIFTH CHOICE: DO NOTHING GRACEFULLY

In the very unlikely event that all of the previous choices prove unworthy, the last resort is to do nothing at all: the contents of the guess files are left as they were. It is hard to think what might cause all the choices to be unavailable, but in that event the guess files would probably contain a 24- or 48-hour old guess. Since the content of the guess files indicates the date, time, and run in which the guess material originated (both the date of the analysis that produced the analysis error coefficients, and the initial date and length of forecast of the sigma coefficients) the analysis codes should have no trouble accommodating an aging guess. At least the information is in place to do so.

III THE GUESS FOR THE SCM (LFM) ANALYSIS

The Successive Correction Method (SCM) analysis used in the ERL run for the LFM forecast needs as its guess a set of one bedient (65x65 points, 381 km grid) fields of height, temperature, wind, and relative humidity. Where the SCM code goes to fetch them is under the control of the Meteorological Operations Division's Senior Duty Meteorologist (SDM). He can select either the FNL or the AVN run as the source, presumably based on meteorological considerations. If the FNL is selected the analysis code looks to

NMC.PROD.VGF12.TttZ.FNL

(tt = 00 or 12 as appropriate) in which the second 6-hour forecast from the GDAS has been placed; if the AVN run is selected the code looks to

NMC.PROD.VGES.TttZ

in which the previous AVN run 12-hour forecast fields have been placed by other operational codes.

Since the guess selection is under human control and since the construction of the VGES file is extremely reliable, no further automated backup is needed.

IV THE GUESS FOR THE HOUGH ANALYSIS

The Hough analysis expects its first guess to be in the form of Hough Coefficients. They are found in a file called

NMC.PROD.HUFGES.TttZ.FNL,

tt = 00 or 12 as appropriate, again indicating the time of the run in which the guess is to be used.

The coefficients are constructed, in Job 110, by a code called SMSPGESV which looks to:

NMC.PROD.VPREFXX.TttZ.FNL,

(tt has the same meaning as above). This is an NMC Random Access file (VSAM type) containing 30-wave pressure coefficients.

Another guess-selecting program, GES4HUFV, also running in Job 110, has the chore of looking to various sources for those pressure coefficients and doing a random access copy operation.

The first choice, as implied above, is the 6-hour forecast of pressure coefficients from the second half of the previous FNL run. The input files are:

for the 00Z guess: NMC.PROD.VSGF06.T18Z.FNL

for the 12Z guess: NMC.PROD.VSGF06.T06Z.FNL

The test for availability is the same as that used in seeking out the guess for the O/I analysis: the forecast in the file must verify at the time of the analysis at which it is to be used. If the contents of the file do not pass the test we start looking through a series of backup possibilities.

The second choice, first backup, is to look to the previous cycle's AVN run where the pressure coefficients are in

NMC.PROD.VS12.TttZ.AVN;

"tt" again is 00 or 12 and the availability test is that the 12-hour forecasts verify at the current analysis time.

The third choice is the 24-hour forecast from the AVN run two cycles back:

NMC.PROD.VS24.TttZ.AVN

where the same availability test applies.

The fourth choice is to fetch the guess from the previous cycle:

NMC.PROD.VPREFIX.TttZ.FNL

where tt = 12 when the 00Z guess is being constructed, and vice versa. The availability test for this file is that it must contain 6-hour forecasts valid twelve hours ago; i.e. the FNL must have run properly two cycles back and the GES4HUFV code must have put the 6-hour forecasts away in the appropriate file.

The fifth, and last, choice, if all those availability tests fail, is to copy the 12-hour old HUFGES coefficients themselves forward into the current HUFGES file. No testing is made at this point.

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The Guess for the O/I

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July 1990

This is a description of the guess files needed for the RAFS regional O/I analysis and the AVN and FNL global O/I analyses, where they come from, and their backup contingencies. Additional sections indicate the sources of the guesses for the SCM analysis (used in the ERL run for the LFM forecast), and the Hough analysis (used as the backup analysis in the AVN run if the CYBER and CRAY are both down or otherwise unavailable).

I. WHAT GUESS INFORMATION DOES THE I/O ANALYSIS NEED?

In general, the O/I analysis needs three classes of meteorological quantities as guesses:

A. A forecast of sigma layer spectral coefficients, presumably valid at the time of the analysis. The number of layers and wave structure of the coefficients must, of course, match the analysis model.

B. Mandatory level analysis error standard deviation spectral coefficients from the previous global O/I analysis - the same analysis that supplied the initial conditions for the sigma coefficients forecast in A.

C. A forecast of a collection of boundary layer parameters (some unchanging) valid at the time of the analysis.

At the present time the regional and global O/I analyses require 18 sigma layers and an 80-wave triangular truncation spectral resolution in the guess sigma coefficients. The error coefficients must be supplied in the 12 mandatory levels at a 30-wave rhomboidal resolution. The boundary layer parameters are carried as grid point values on the 29646 point (243x122) T80 global gaussian transform grid.

The guess quantities reside in files on the NAS9000 computer system and are copied to the CYBER or CRAY as needed.

The files for the guesses are:

Sigma forecasts:

NMC.PROD.SGES.TttZ.FNL

Analysis errors:

NMC.PROD.EGES.TttZ.FNL

Boundary parameters:

NMC.PROD.BGES.TttZ.FNL

where tt = 00 or 12 according to the cycle.

As with all guess files, the naming convention for the cycle time (00Z or 12Z) indicates the time at which the guess is to be used, not the cycle in which the guess quantities were generated. Because of backup possibilities, there is no guarantee that the guess information in the files is from the first choice or normal source. The run that generated the guess, the initial time of the forecasts, and the specific date of the analysis that supplied the analysis errors are included in the files for the O/I system to do with as it pleases. Also, in operations, the code that selects the guess from the various possibilities (GGEST80, running in JOB 110), writes a message to the run log stating which possibility was indeed selected.

In full detail the content of the files looks like this (using "Data Dictionary" notation):

SGES =

```

ON85LABEL
+
SELALABEL
+
Z*
+
ln(p*)
+
{T}18
+
{ +D}18
+
{R}18
+
QPF

```

for a total of 77 records.

EGES =

```

ON85LABEL
+
TAUIDATE
+
{ZE}12
+
{UE+VE}12
+
{RHE}6

```

for a total of 44 records.

BGES =

ON85LABEL
+
TAUIDATE
+
TSCF
+
SOILM
+
SNOW
+
TG1
+
TG2
+
TG3
+
ZOR
+
CV
+
CVB
+
CVT
+
ALB
+
SLMASK

for a total of 14 records.

On the NAS9000, all the numbers (real and integer) are 32 bits in length. On the CYBER, all real numbers are carried in half precision (32 bits), all integers are 64 bit words. On the CRAY all numbers are carried as 64 bit words.

Defining the elements:

ON85LABEL = Just what it sounds like, the NMC Office Note
85 file label;

SELALABEL = One record, totalling 212 words
(all real numbers excepting IDATE):
TAU + IDATE + SIGMA8 + DUMMY + WAVES + XLAYERS +
TRUN + ORDER + REALFORM + GENCODE;

(NOTE: As of the printing of this office note, the SELALABEL is only constructed through the SIGMA8 terms; it is intended that the label will grow to full maturity with the implementation of the next version of the spectral model on the CRAY.)

TAUIDATE = One record: TAU + IDATE

TAU = the forecast hour;

IDATE = hour + month + day + year-of-century,
specifying the hour (UTC) and date/time of the
analysis, or the initial date/time of the
forecast;

SIGMA8 = Values of the sigma coordinate at 19 levels from
the ground up, followed by the sigma coordinate
difference across the 18 layers;

DUMMY = An array of zeros, dimensioned such that SIGMA8 +
DUMMY totals 201 words (this allows for future
growth of the model);

WAVES = Horizontal resolution (longitudinal wave number)
of the forecast model;

XLAYERS = Vertical resolution (number of layers) of the
forecast model;

TRUN = Mode of spectral coefficient truncation:
1.0 - Triangular
2.0 - Rhomboidal;

ORDER = Layout of the coefficients in arrays:
1.0 - By Row (or hypotenuse),
CYBER/CRAY style
2.0 - By column, NAS style;

REALFORM = Format of real numbers:
1.0 - IBM format
2.0 - CYBER format
3.0 - CRAY format;

GENCODE = NMC Office Note 84 Generating code (Table 10) for
the forecast model;

$Z^*, \ln(p^*), T, D, R$ = Spectral coefficients (3321 complex
numbers, T80 truncation) representing terrain
height, log of surface pressure, virtual
temperature, vorticity, divergence, and specific
humidity;

ZE, UE, VE, RHE = Spectral coefficients (31x31 complex
numbers, R30 truncation) representing analysis
error standard deviation of height, U wind
component, V wind component, and relative
humidity;

QPF = Array of (243x122) words of quantitative precipitation forecast on the T80 gaussian transform grid;

TSCF = Array of (243x122) words of sea surface and land surface temperatures, deg. K;

SOILM = Array of (243x122) words of Ground wetness, mm;

SNOW = Array of (243x122) words of Snow depth, m;

TG1, TG2, TG3 = Arrays of (243x122) words of underground temperature at three levels, deg. K;

ZOR = Array of (243x122) words of ground roughness parameter, cm;

CV = Array of (243x122) words of convective cloud amount - percentage;

CVB = Array of (243x122) words of sigma level (1-18) of convective cloud base;

CVT = Array of (243x122) words of sigma level (1-18) of convective cloud tops;

ALB = Array of (243x122) words of surface albedo, fraction;

SLMASK = Array of (243x122) words of land/sea/seaice mask:
0=sea, 1=land, 2=ice.

The file name in ON85LABEL is made up from the third qualifier in the corresponding data set name, SGES, EGES and BGES respectively, and the cycle time for which the guess is valid, i.e., 00Z or 12Z. The names are SGES00, SGES12, EGES00, EGES12, BGES00, and BGES12. (Preliminary guess files for the off-time analysis in the GDAS, for use at 06Z and 18Z, are also prepared and identified accordingly. Their construction essentially parallels the on-time guess construction.) The run marker in the ON85 label is set to indicate the source of the guess. Normally this is the FNL run (R=5), but if a backup source is used (see below) the run marker may indicate the AVN run (R=3).

II WHENCE THE GUESS AND WHAT'S THE BACKUP?

As mentioned above, a program called GGEST80 runs early in the 00Z and 12Z cycles (as a step in Job 110) with the task to select appropriate material and write it into the EGES, SGES and BGES files. The selection process is one of checking that the most desirable quantities are available or, failing that, searching through a hierarchy of backup possibilities. The idea is to assure that, barring total disasters, some reasonably usable guess is always available for the analysis models.

FIRST CHOICE: GDAS FROM THE PREVIOUS FNL RUN

The first choice, of course, is the six-hour forecast generated in the second half of the GDAS from the previous FNL run. For the 00Z guess, the input files are:

Sigma Forecast: NMC.PROD.CYSF06.T18Z.FNL
Analysis errors: NMC.PROD.CYEANL.T18Z.FNL
Boundary parameters: NMC.PROD.CYBF06.T18Z.FNL

and for the 12Z guess:

Sigma Forecast: NMC.PROD.CYSF06.T06Z.FNL
Analysis errors: NMC.PROD.CYEANL.T06Z.FNL
Boundary parameters: NMC.PROD.CYBF06.T06Z.FNL

The test for the availability of the guess from this source is simple: the date/time on the CYSF06 file must be such that the 6-hour forecast is valid at the current date/time and all the files must be complete. If any of these conditions are not met, for whatever reason, the FNL is rejected as a source for the guess and we start searching through the backup choices.

SECOND CHOICE: 12-HOUR FORECAST FROM THE EARLIER AVN RUN

The second choice (the first backup option) is to turn to the 12-hour forecast from the previous cycle's AVN run. The input files are, for the 00Z guess:

Sigma Forecast: NMC.PROD.CYSF12.T12Z.AVN
Analysis errors: NMC.PROD.CYEANL.T12Z.AVN
Boundary parameters: NMC.PROD.CYBF12.T12Z.AVN

and for the 12Z guess:

Sigma Forecast: NMC.PROD.CYSF12.T00Z.AVN
Analysis errors: NMC.PROD.CYEANL.T00Z.AVN
Boundary parameters: NMC.PROD.CYBF12.T00Z.AVN

As before, the test for the availability of the guess from this source is simple: the date/time on the CYSF12 file must be such that the 12-hour forecast is valid at the current date/time and all the files must be complete. If any of these conditions are not met, for

whatever reason, the 12 hour old AVN is rejected as a source for the guess and we turn to the next of the backup choices.

THIRD CHOICE: 24-HOUR FORECAST FROM THE PRIOR AVN RUN

The third choice (the second backup option) is to turn to the 24-hour forecast from the AVN run two cycles back. The input files are, for the 00Z guess:

Sigma Forecast: NMC.PROD.CYSF24.T00Z.AVN

Analysis errors: NMC.PROD.CYEANL.T00Z.AVN

Boundary parameters: NMC.PROD.CYBF24.T00Z.AVN

and for the 12Z guess:

Sigma Forecast: NMC.PROD.CYSF24.T12Z.AVN

Analysis errors: NMC.PROD.CYEANL.T12Z.AVN

Boundary parameters: NMC.PROD.CYBF24.T12Z.AVN

As ever, the test for the availability of the guess from this source is simple: the date/time on the CYSF24 file must be such that the 24-hour forecast is valid at the current date/time and all the files must be complete. If any of these conditions are not met, for whatever reason, the 24-hour old AVN is rejected as a source for the guess and we turn to the next of the backup choices. There are not many choices left.

FOURTH CHOICE: CARRY FORWARD THE 12-HOUR OLD GUESS

In the rather unlikely event that none of the above was available, our next recourse is to pick up the guess that was used 12 hours ago, in the previous cycle, and simply copy it forward. The input files are, for the 00Z guess:

Sigma Forecast: NMC.PROD.SGES.T12Z.FNL

Analysis errors: NMC.PROD.EGES.T12Z.FNL

and for the 12Z guess:

Sigma Forecast: NMC.PROD.SGES.T00Z.FNL

Analysis errors: NMC.PROD.EGES.T00Z.FNL

The availability test for this choice is that the SGES file must contain a 6-hour forecast valid 12 hours ago; i.e., the FNL must have

run properly two cycles back and the GGEST80 code must have worked properly in the previous cycle.

Note that the boundary parameters (BGES) are NOT carried forward; the BGES file is left as is. This is because of the strong diurnal variation in some of the boundary parameters - a 24-hour old BGES is much more appropriate to use than a 12-hour old guess that is out of phase with the diurnal cycle.

FIFTH CHOICE: DO NOTHING GRACEFULLY

In the very unlikely event that all of the previous choices prove unworthy, the last resort is to do nothing at all: the contents of the guess files are left as they were. It is hard to think what might cause all the choices to be unavailable, but in that event the guess files would probably contain a 24- or 48-hour old guess. Since the content of the guess files indicates the date, time, and run in which the guess material originated (both the date of the analysis that produced the analysis error coefficients, and the initial date and length of forecast of the sigma coefficients) the analysis codes should have no trouble accommodating an aging guess. At least the information is in place to do so.

III THE GUESS FOR THE SCM (LFM) ANALYSIS

The Successive Correction Method (SCM) analysis used in the ERL run for the LFM forecast needs as its guess a set of one bedient (65x65 points, 381 km grid) fields of height, temperature, wind, and relative humidity. Where the SCM code goes to fetch them is under the control of the Meteorological Operations Division's Senior Duty Meteorologist (SDM). He can select either the FNL or the AVN run as the source, presumably based on meteorological considerations. If the FNL is selected the analysis code looks to

NMC.PROD.VGF12.TttZ.FNL

(tt = 00 or 12 as appropriate) in which the second 6-hour forecast from the GDAS has been placed; if the AVN run is selected the code looks to

NMC.PROD.VGES.TttZ

in which the previous AVN run 12-hour forecast fields have been placed by other operational codes.

Since the guess selection is under human control and since the construction of the VGES file is extremely reliable, no further automated backup is needed.

IV THE GUESS FOR THE HOUGH ANALYSIS

The Hough analysis expects its first guess to be in the form of Hough Coefficients. They are found in a file called

NMC.PROD.HUFGES.TttZ.FNL,

tt = 00 or 12 as appropriate, again indicating the time of the run in which the guess is to be used.

The coefficients are constructed, in Job 110, by a code called SMSPGESV which looks to:

NMC.PROD.VPREFXX.TttZ.FNL,

(tt has the same meaning as above). This is an NMC Random Access file (VSAM type) containing 30-wave pressure coefficients.

Another guess-selecting program, GES4HUFV, also running in Job 110, has the chore of looking to various sources for those pressure coefficients and doing a random access copy operation.

The first choice, as implied above, is the 6-hour forecast of pressure coefficients from the second half of the previous FNL run. The input files are:

for the 00Z guess: NMC.PROD.VSGF06.T18Z.FNL

for the 12Z guess: NMC.PROD.VSGF06.T06Z.FNL

The test for availability is the same as that used in seeking out the guess for the O/I analysis: the forecast in the file must verify at the time of the analysis at which it is to be used. If the contents of the file do not pass the test we start looking through a series of backup possibilities.

The second choice, first backup, is to look to the previous cycle's AVN run where the pressure coefficients are in

NMC.PROD.VS12.TttZ.AVN;

"tt" again is 00 or 12 and the availability test is that the 12-hour forecasts verify at the current analysis time.

The third choice is the 24-hour forecast from the AVN run two cycles back:

NMC.PROD.VS24.TttZ.AVN

where the same availability test applies.

The fourth choice is to fetch the guess from the previous cycle:

NMC.PROD.VPREFXX.TttZ.FNL

where tt = 12 when the 00Z guess is being constructed, and vice versa. The availability test for this file is that it must contain 6-hour forecasts valid twelve hours ago; i.e. the FNL must have run properly two cycles back and the GES4HUFV code must have put the 6-hour forecasts away in the appropriate file.

The fifth, and last, choice, if all those availability tests fail, is to copy the 12-hour old HUFGES coefficients themselves forward into the current HUFGES file. No testing is made at this point.